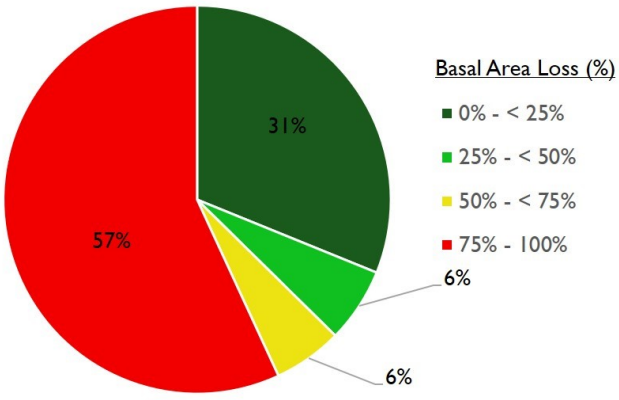
Conifer regeneration potential in the 2020 Claremont-Bear Fire (Plumas National Forest)

We applied a spatially-explicit model developed by Shive et al. (2018) to produce a five-year post-fire predictive map of potential conifer regeneration following the 2020 Claremont-Bear Fire on the Plumas National Forest. There are five predicted probability classes (see table on page 2) mapped across the burn area that relate to the probability of observing at least one regenerating conifer five years after fire at the 60-m^2 (field plot) scale.

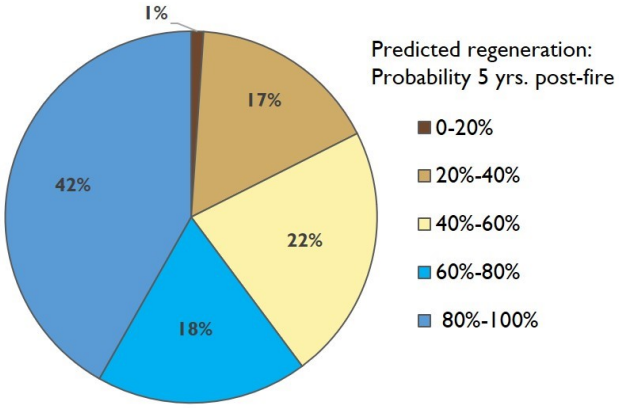
Key Findings

- 57% of the Claremont-Bear Fire landscape burned at high severity (75%-100% basal area mortality).
- 42% of the burned area is within the highest prediction class for seedling density (80-100%).
- In areas that were yellow pine or mixed conifer forest prior to the fire (see map on page 2), we found that 18% (17,828 hectares) of the burned area was within the two lowest prediction categories.
  - In the lowest prediction categories, the probability of finding at least one regenerating conifer five years after fire (at the 60-m^2 scale) is between 0-20% and 20-40%.
  - Field data indicate that one can expect seedling densities in these categories that range from 0-14,666 seedlings/ha (mean: 144 ± 86 seedlings/ha) to 0-15,333 seedlings/ha (mean: 317 ± 55 seedlings/ha) respectively.
  - The median for both of these categories is 0 seedlings/ha suggesting that 18% of the Claremont-Bear Fire area will likely have little to no conifer regeneration in the short-term.

Percent of fire in each fire severity class (all vegetation types)



Percent of fire in each regeneration probability class (conifer forest prior to the fire)



Variables used in model

FIRE: *burn severity, time since fire*
TOPOGRAPHY: *aspect, slope,*
CLIMATE: *actual evapotranspiration, annual precipitation, snowpack, climatic water deficit*
SEED AVAILABILITY: *Seed availability proxy (SAP) 150-m neighborhood*

Link to GIS files:
T:\FS\NFS\Plumas\Project\SO\NorthComplexFire_LandscapeAssessment\GIS\MasterData\Regen_Prediction\Model_Outputs\

Citation: *Shive, K. L., Preisler, H. K., Welch, K. R., Safford, H. D., Butz, R. J., O'Hara, K. and Stephens, S. L. 2018. From the stand scale to the landscape scale: predicting the spatial patterns of forest regeneration after disturbance. Ecological Applications 28: 1626-1639.*

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Predictive map showing the probability of observing at least one regenerating conifer five years after fire at the 60-m^2 (field plot) scale for the 2020 Claremont-Bear Fire. The model combines six of the most common conifer species found in California yellow pine and mixed conifer forests (Douglas-fir, incense-cedar, Jeffrey pine, ponderosa pine, sugar pine, and white fir) into a single presence/absence variable. Pre-fire vegetation maps were used to exclude areas that were not yellow pine or mixed conifer forest prior to the fire. The excluded areas, shown in white, include chaparral and other non-forest vegetation types that may have naturally low conifer regeneration potential. Refer to the box below for a list of vegetation types within the Claremont-Bear Fire that were included in the predictive map.

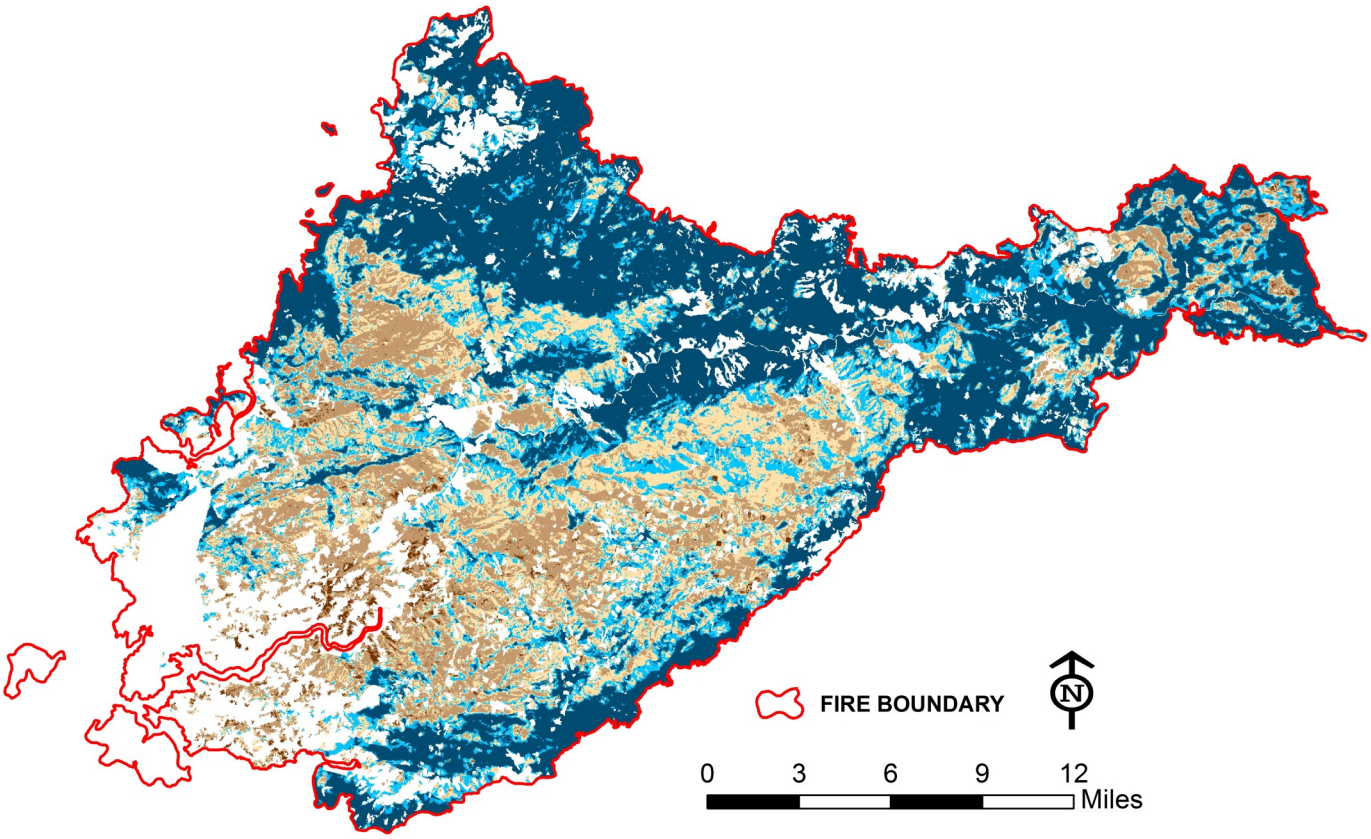

Table displays the minimum, maximum, median, mean, and standard error (SE) of observed conifer seedlings/ha for all 24 wildfires included in the Shive et al. (2018) forecast model by predicted probability class.

Predicted probability class	Observed densities (seedlings/ha)			
	Min	Max	Median	Mean (SE)
0-20%	0	14,666	0	144 (86)
20-40%	0	15,333	0	317 (55)
40-60%	0	17,166	166	672 (101)
60-80%	0	380,166	333	3,665 (985)
80-100%	0	201,666	1,333	6,301 (755)

Regeneration predictions are shown for the following pre-fire forest (WHR) types: *eastside pine (EPN), Jeffrey pine (JPN), montane hardwood-conifer (MHC), ponderosa pine (PPN), Sierra mixed conifer (SMC), white fir (WFR), red fir (RFR)*

Excluded vegetation types: *shrublands (low sage, montane chaparral, sagebrush); aspen; riparian; grasslands (annual, perennial, and wetlands); and other non-forest types (barren, lacustrine, etc.)*

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